

NASA Helps Invent Revolutionary X-Ray Instrument

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A 3-year collaborative effort by NASA, industry and university researchers has resulted in the development of an instrument which can generate the world's most intense source of commercial x-rays. Capable of generating beams that are more than 100 times the intensity of other conventional x-ray sources, the new instrument is expected to lead to improvements in biotechnology research and have a wide variety of applications in scientific research, medicine and industry.

The revolutionary invention was developed by researchers at MSFC; X-Ray Optical Systems, Inc., Albany, NY; and the Center for X-Ray Optics of the State University of New York at Albany.

"This new optical instrument provides something never before possible: a capability to control the direction of x-ray beams," explained Dr. Walter Gibson, professor of physics at the State University of New York at Albany.

At the heart of the instrument is a new type of optics for x rays called "capillary optics." "The x rays are controlled by reflecting them through tens of thousands of tiny curved channels or capillaries, similar to the way that light is directed through fiber optics," said Gibson. "Thus, we are able to concentrate the beams to suit the particular needs of the intended research or medical procedure." Researchers at Marshall are using the newly developed x-ray instrument to determine the atomic structure of important proteins which are the targets for drug design by leading pharmaceutical companies. "Our current research efforts focus on many difficult public health problems such as cancer, AIDS and heart

disease," said Dr. Daniel Carter of Marshall's Laboratory for Structural Biology.

"This new capillary x-ray technology will allow us to pursue more challenging research problems in our own laboratory with a speed and effectiveness never before possible," said Carter. "These and future applications should have a profound impact on many areas of science and medicine.

"We expect this new technology to significantly accelerate the ability of researchers to gather the information necessary to design entire families of highly effective, disease fighting drugs," said Carter. The new x-ray lens system, designed by the University of New York at Albany under NASA contract, incorporates the special optics manufactured by X-Ray Optical Systems.

"As a result of working with NASA and the State University of New York at Albany, we have developed x-ray optics which will provide important commercial benefits to a broad range of industries," said David Gibson, president of X-Ray Optical Systems, Inc. "Many commercial applications of this new technology are possible, including better manufacturing control for semiconductor circuits, better medical imaging, such as in mammography, and improved forensics."

The high intensity x-ray beams will permit scientific and medical research to be performed in less time with higher accuracy. In some cases the research was not feasible in standard x-ray laboratories. Also, the instrument could permit the use of smaller, lower cost and safer x-ray sources.

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Biographical Sketch: Bob Lessels is the technical writer/editor (physical sciences) for the Technology Transfer Office at the Marshall Center. A graduate of the University of Nebraska, he has been a professional journalist for the past 30 years. He joined NASA in 1986. ■